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ABSTRACT

An index of the effectiveness of classrooms, schools, districts, or other educational units can be developed by, first, determining the differences between the actual achievements of individual children and the achievements expected on the basis of regression equation predictions and, second, averaging these differences for all children in the unit. Measures of each child's school ability are major contributions to the regression predictions, but are not always available. A study was undertaken to compare three methods for developing an index without such measures. The study data were the results of ability measures and statewide achievement tests for almost 70,000 children enrolled in grades 3 through 6 in 95 elementary schools. The complete index accounted for student ability, ethnicity, gender, age, and home language. The first alternative index simply omitted the ability variable. The second alternative substituted first-grade mathematics test scores for the ability measure. The third alternative used differences between first- and second-grade achievement as the substitute measure. The substitute correlating most highly with the complete index was the version omitting the ability measure altogether. The potential value of all three methods was indicated by their relatively high correlations. These correlations are presented in two tables. (PGD)

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In recent years a number of authors (e.g., Dyer et al., 1969; Frederiksen & Edmunds, 1979; Milazzo, Buchanan, & Schutz, 1981; Rowan & Denk, 1982; Helmstadter and Walton, 1985) have recommended and used an index of effective schooling which reflects the difference between actual achievement and achievement expected on the basis of a regression equation prediction where the predictor variables are conditions over which educators have no (or little) control. Once such a residual is determined for each child, an index of effectiveness of the classroom, school, school district or other educational unit is composed of the average residual for all children in that unit. Typically, once an "effective" unit has been identified by this procedure, it is examined in detail and the resulting characteristics are described and portrayed as a model for other units to follow.

Almost always (see Helmstadter and Walton, 1985) a major contributor to the regression prediction is a measure of each child's school ability. Unfortunately, such a measure is not always available for children in many of the educational units on which effectivesess information is desired. Under these circumstances, some substitute for the individual child's school ability must be found. The purpose of this study was to compare three suggested alternatives with an index based on complete information, and thus determine the extent to which residual indexes of effective schooling could be independent of a measure of each child's school ability.

The data for this study were the results of statewide achievement tests in reading and mathematics for a total of 69,985 children in grades three through six located in 95 elementary schools for which an index of each child's school ability was available. For each grade level, for each of three years and separately for mathematics and for reading, four different residual indexes of school effectiveness were computed and compared. The first and most conceptually satisfying index was based on residuals calculated using ethnicity, gender, age, language spoken at home and school ability as the predictors. This index was referred to as the complete index. The second index was the same except that school ability was omitted in the prediction equation. A third index was based on a regression in which the average mathematics concepts and applications subtest score in the first grade in that school was substituted for each child's school ability in the prediction equation. The fourth index was based on residuals in which the school ability substitute used in the regression was the difference between the second grade and the first grade achievement in that school. The comparison among the indexes was accomplished by calculating each of the four indexes of effectiveness for the same set of schools (varying in number from 34 to 95) and examining the resulting correlations with the complete index.

Correlations of the three alternative indexes of effectiveness with the complete index for each year and each grade level are given in Table 1 for achievement in mathematics and in Table 2 for achievement in reading. The average of the correlations (obtained using Fisher's z transformation) with the complete index over all years, all grades and both subject matters turned out to be .794 for the index which simply omitted school ability; .736 for the index using mathematics achievement as a substitute for school

Table 1

Correlations of Several Alternative School Effectiveness Indexes with the Complete Index for Achievement in Mathematics

Year	Index	Grade 3	Grade 4	Grade 5	Grade 6	Average for Year[1]
1981	Without School Ability	.85	.83	.81	.77	.81
	Math Achievement as Ability	.82	.73	.79	.76	.78
	Gain in Achievement as Ability	.84	.81	.77	.72	.79
1982	Without School Ability	.83	.82	.83	.79	.82
	Math Achievement as Ability	.72	.79	.79	.79	.77
	Gain in Achievement as Ability	.79	.81	.83	.80	.81
1983	Without School Ability	.75	.87	.82	.73	.80
	Math Achievement as Ability	.73	.86	.85	.71	.80
	Gain in Achievement as Ability	.79	.87	.84	.76	.82
Average for Grade[1]	Without School Ability	.81	.84	.82	.77	.81
	Math Achievement as Ability	.76	.81	.81	.75	.78
	Gain in Achievement as Ability	.81	.83	.82	.76	.82

[1]Averages were obtained through the use of Fisher's z transformation.

Table 2

Correlations of Several Alternative School Effectiveness Indexes with the Complete Index for Achievement in Reading

Year	Index	Grade 3	Grade 4	Grade 5	Grade 6	Average for Year[1]
1981	Without School Ability	.86	.80	.70	.63	.76
	Math Achievement as Ability	.82	.66	.61	.56	.68
	Gain in Achievement as Ability	.79	.80	.63	.63	.72
1982	Without School Ability	.82	.77	.76	.74	.77
	Math Achievement as Ability	.72	.65	.64	.63	.66
	Gain in Achievement as Ability	.81	.74	.78	.76	.77
1983	Without School Ability	.81	.86	.79	.71	.80
	Math Achievement as Ability	.65	.79	.79	.52	.70
	Gain in Achievement as Ability	.76	.85	.82	.76	.81
Average for Grade[1]	Without School Ability	.83	.81	.75	.70	.78
	Math Achievement as Ability	.74	.71	.69	.57	.68
	Gain in Achievement as Ability	.79	.80	.75	.73	.77

[1]Averages were obtained through the use of Fisher's z transformation.

ability and .789 for the index using gain in the achievement scores between first and second grade as a substitute for school ability. Over the 24 possible comparisons (three years, four grades and two subject matters) the index simply omitting the school ability predictor was most closely associated with the complete index 14 times; the index using school gain was most closely associated with the complete index nine times; and the index using mathematics achievement as a substitute was most closely associated with the complete index only once.

While there is certainly no reason not to make use of a school ability index in using the regression residual approach to evaluating programs, the relatively high (low eighties for the math and high seventies for the reading) correlations with the complete index clearly suggest that an index without the individual child's school ability measure can indeed be used in place of the more conceptually satisfying approach without a great deal of distortion in the results. Further, it appears that the simplest of the three alternatives is likely to produce results which are most similar to those which would be obtained when the complete index can be used.

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